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Cross-cultural comparison of motor competence in children from Australia and Belgium

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Motor competence in childhood is an important determinant of physical activity and physical fitness in later life. However, childhood competence levels in many countries are lower than desired. Due to the many different motor skill instruments in use, children's motor competence across countries is rarely compared. The purpose of this study was to evaluate the motor competence of children from Australia and Belgium using the Körperkoordinationstest für Kinder (KTK). The sample consisted of 244 (43.4% boys) Belgian children and 252 (50.0% boys) Australian children, aged 6–8 years. A MANCOVA for the motor scores showed a significant country effect. Belgian children scored higher on jumping sideways, moving sideways and hopping for height but not for balancing backwards. Moreover, a Chi squared test revealed significant differences between the Belgian and Australian score distribution with 21.3% Belgian and 39.3% Australian children scoring "below average." The very low levels reported by Australian children may be the result of cultural differences in physical activity contexts such as physical education and active transport. When compared to normed scores, both samples scored significantly worse than children 40 years ago. The decline in children's motor competence is a global issue, largely influenced by increasing sedentary behavior and a decline in physical activity.

Keywords: motor competence, motor assessment, KTK, children, cross-cultural comparison, Belgium, Australia

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Introduction

The ability to perform various motor skills (e.g., running, kicking, jumping, throwing) in a proficient manner, is often defined as motor competence (Gabbard, 2008; Haga et al., 2008; Gallahue et al., 2012). Motor competence relies on motor coordination which refers to the cooperation between muscles or muscle groups to produce a purposeful action or movement (Magill, 2011), and physical fitness which refers to the capacity to perform physical activity (Ortega et al., 2008).

Over the past few decades, decreased levels of motor competence in primary school children have been reported in Western countries (Bös, 2003; Okely and Booth, 2004; Vandorpe et al., 2011; Hardy et al., 2013; Tester et al., 2014). These findings are of major concern as children with high motor competence have been linked with positive outcomes in both physical activity (PA) and weight status (Lubans et al., 2010). Furthermore, motor competence predicts levels of PA and

physical fitness in later life (Barnett et al., 2008; Lopes et al., 2011; Jaakkola et al., 2015). In view of this, it is important to examine and monitor motor behavior during childhood in order to provide appropriate strategies to support children's motor development.

A variety of test instruments are used to measure motor competence during childhood (see Cools et al., 2009 and Wiart and Darrah, 2001 for reviews on this matter). The choice of assessment batteries depends on a number of criteria such as the purpose of measurement, age specificity, and the suitability of the test for the target group (Cools et al., 2009). The popularity and implementation of test instruments also varies depending on the geographical region. For example, in Australia, assessment batteries such as the Test of Gross Motor Development, Second Edition (TGMD-2; Ulrich, 2000), are generally used to measure motor competence of children through a set of fundamental motor skills (e.g., running, throwing, jumping, catching), whilst Belgium and other European countries have preferred to use Körperkoordinationstest für Kinder (KTK; Kiphard and Schilling, 1974, 2007), a non-sport specific assessment of a child's gross motor coordination.

Although motor tests measure the same broad construct (i.e., motor competence), research on test comparisons generally reveals only moderate correlations. For instance, a study of Fransen et al. (2014) compared the KTK and Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2; Bruininks and Bruininks, 2005) in primary school children and found a moderate association between the two tests performances. These findings are similar to other convergent validity studies (Smits-engelsman et al., 1998; Van Waelvelde et al., 2007; Logan et al., 2011) which suggests that assessment batteries should not be used interchangeably to evaluate motor competence. Alternatively, the wide adoption of a highly standardized test battery, would enable comparison of motor competence within and between countries.

There is a dearth of research comparing children's motor competence between countries. One study by Chow et al. (2001) compared the motor competence between children from China (Hong Kong) and the United States, and revealed differences between the groups: Chinese children performed significantly better on manual dexterity and balance tasks whilst American children outperformed Chinese children on throwing and catching tasks. These differences give insight into different cultural practices (such as encouragement in some types of sport e.g., baseball in America) that help or hinder development in certain types of skills. Clearly, cross-cultural research can provide valuable insights into how different motor skills are developed in different cultural contexts and how tests which measure specific motor skills are sensitive to cultural differences.

In summary, it would be unwise to undertake comparisons using different assessment tools because the small, but significant, differences in measurement might not provide meaningful findings and valid conclusions. As highlighted in the study of Chow et al. (2001), we should also be cautious about using an assessment tool which relates more closely to the sports played in some countries more than others, as whilst this gives information on particular skills it may not present an overall picture of the populations' motor competence. A better approach would be to adopt a standardized non sport specific test of motor competence across all countries. The KTK assesses motor coordination without a sport context and may therefore be such a suitable test. It is a standardized and popular test battery that makes it an appropriate tool to measure motor competence internationally and provide cross-cultural comparisons (Iivonen et al., 2014).

There is evidence of streamlining of assessment and international collaborations in other areas of health and physical activity behavior. An example is the development of the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003). In 1998 an International Consensus Group met in Geneva with the purpose of developing a self-reported measure of physical activity which could be used to assess physical activity across countries. It was recognized at that time that physical inactivity was a global health concern, but that there were no standardized approaches to measurement which made international comparisons and global surveillance challenging. Similarly, the wide adoption of a single test to measure motor competence, has the potential to build a strong picture of how children are performing on an international level rather than just on a national level. This will have many benefits in terms of understanding on a global level how motor competent children are and then proceeding to understand what cultural factors help to better facilitate motor competence.

The aim of this study was to evaluate the motor competence of 6 to 8 year-old children from Australia and Belgium using the Körperkoordinationstest für Kinder (KTK). A secondary aim of this study was to compare the distribution of both samples across the KTK performance categories and against the reference population from 1974. Based on the declining levels of motor competence found in Western countries (Bös, 2003; Okely and Booth, 2004; Vandorpe et al., 2011; Hardy et al., 2013; Tester et al., 2014), it was hypothesized that the distribution of both Australian and Belgian children would be shifted toward the lower end of the motor competence continuum when compared to the KTK reference population of 1974.

Method

Participants

Data were collected in Melbourne (Australia) between October 2012 and June 2013 and Flanders (Belgium) between September 2012 and November 2012. A total of 496 children (252 Australian and 244 Belgian children) between the ages of 6 and 8 years participated. In Melbourne, four schools were selected in four local council municipalities. In Flanders, children were recruited from five schools in different provinces. For each participant written informed consent was obtained from the parents or guardian. The study was approved by the University Ethics Committee and the Department of Education and Early Childhood Development in both countries.

Measurements

All assessments were conducted by trained assessors. All assessors had a Physical Education background and followed a training on